

October 2010

Copyright Notice

Copyright © 2010 Silicon Image, Inc. All rights reserved. These materials contain proprietary and confidential information (including trade secrets, copyright, and other interests) of Silicon Image, Inc. You may not use these materials except only for your bona fide non-commercial evaluation of your potential purchase of products and/or services from Silicon Image or its affiliates, and/or only in connection with your purchase of products and/or services from Silicon Image or its affiliates, and only in accordance with the terms and conditions herein. You have no right to copy, modify, transfer, sublicense, publicly display, create derivative works of or distribute these materials, or otherwise make these materials available, in whole or in part, to any third party.

Trademark Acknowledgment

Silicon Image™, VastLane™, SteelVine™, PinnaClear™, Simplay™, Simplay HD™, Satalink™, InstaPort™, and TMDST™ are trademarks or registered trademarks of Silicon Image, Inc. in the United States and other countries. HDMI®, the HDMI logo and High-Definition Multimedia Interface™ are trademarks or registered trademarks of, and are used under license from, HDMI Licensing, LLC. MHL™ is a trademark of, and is under license from, MHL LLC. x.v.Color™ is a trademark of Sony Corporation.

Export Controlled Document

This document contains information subject to the Export Administration Regulations (EAR) and has a classification of EAR99 or is controlled for Anti-Terrorism (AT) purposes. Transfer of this information by any means to an EAR Country Group E:1 or foreign national thereof (whether in the U.S. or abroad) may require an export license or other approval from the U.S. Department of Commerce. For more information, contact the Silicon Image Director of Global Trade Compliance.

Further Information

To request other materials, detailed hardware and software guides, and additional information, contact your local Silicon Image, Inc. sales office or visit the Silicon Image, Inc. web site at www.siliconimage.com. Information about obtaining licenses required for using HDMI and HDCP technologies is available from www.hdmi.org and www.digital-cp.com.

© 2010 Silicon Image, Inc. All rights reserved

General Description

The SiI9244 Silicon Image Mobile High-definition Link (MHL™) Transmitter facilitates the design of low ball count, low-power mobile HD video output applications. It implements MHL technology that uses a single twisted pair and 5 pins of a mobile connector to carry formatted video and audio to MHL-capable receivers. MHL signals are readily converted to a standard HDMI signal through a MHL-to-HDMI bridge when needed.

Silicon Image Mobile High-definition Link products use the latest generation of TMDS core technology. With this ultra-low-power solution, mobile phones, HD camcorders, digital still cameras, and personal mobile devices can connect to a large installed base of HDMI TVs.

HDMI Interface

- HDMI serial link receiver interface
- HDMI-to-MHL transcode mode
- CEA/EIA 861D video format up to 1920x1080p @ 24/30 fps
- Maximum input frequency 75 MHz.

Additional Features

- 1 MHz local I²C bus
- Standard part covers extended (–30 to +85 °C) temperature range.

Features

The SiI9244 transmitter and a MHL-to-HDMI bridge together meet the HDMI compliance test specification.

- The transmitter sends all data and clock signals over a single differential pair
- A single-wire control bus supports all sideband signaling for DDC, remote control, and HPD

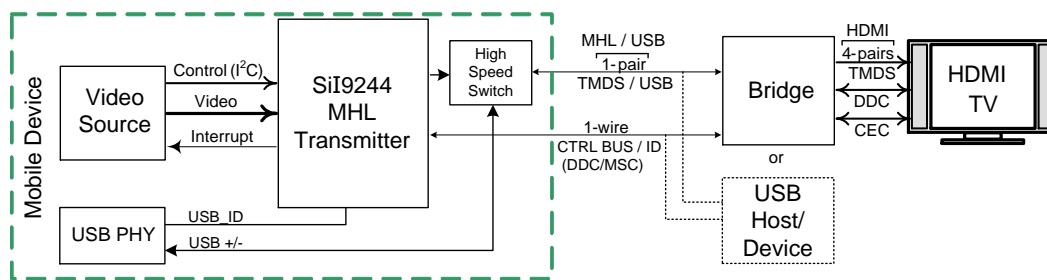


Figure 1. Typical Application of the SiI9244 Transmitter

Ball Diagrams

Figure 2 shows the pin assignments of the SiI9244 transmitter. Pin names are generalized by type for this document. The list below the diagram describes the purpose of each type. The package is a 49-ball VFPGA package.

	1	2	3	4	5	6	7	
A	RSVDH	GND	MDATA_IO	MDATA_IO	NC	NC	MCTRL_I	A
B	RSVDL	RSVDH	RSVDL	GND	VCC33	USB_IO	RSVDL	B
C	CCTRL_I	RSVDH	MCTRL_I	VCC12	GND	MCTRL_I	CCTRL_O	C
D	CCTRL_IO	RSVDL	GND	VCC18	VCC12	CCTRL_I	CCTRL_I	D
E	HCTRL_IO	GND	VCC18	VCC12	VCC33	VCC12	GND	E
F	HDATA_I	GND	HCTRL_I	HCTRL_I	VCC12	GND	HCTRL_O	F
G	HDATA_I	HDATA_I	HDATA_I	HDATA_I	HDATA_I	HDATA_I	HDATA_I	G
	1	2	3	4	5	6	7	

Pin Name	Purpose
HDATA_I	HDMI data Input
HCTRL_x	HDMI control Input, Output, or Input/Output
ADATA_I	Audio data Input (S/PDIF, I ² D)
ACTRL_I	Audio control Input (WS, MCLK, SCK)
CCTRL_x	Chip control Input, Output, or Input/Output (INT, RESET, CSCL, CSDA, etc.)
MDATA_IO	MHL data Input/Output (TMDS-level signals)
MCTRL_I	MHL control Input (CBUS, VSENSE, etc.)
USB_IO	USB Input/Output (differential signals, ID information)

Figure 2. Ball Diagram (Top View)

Packaging

Package Dimensions

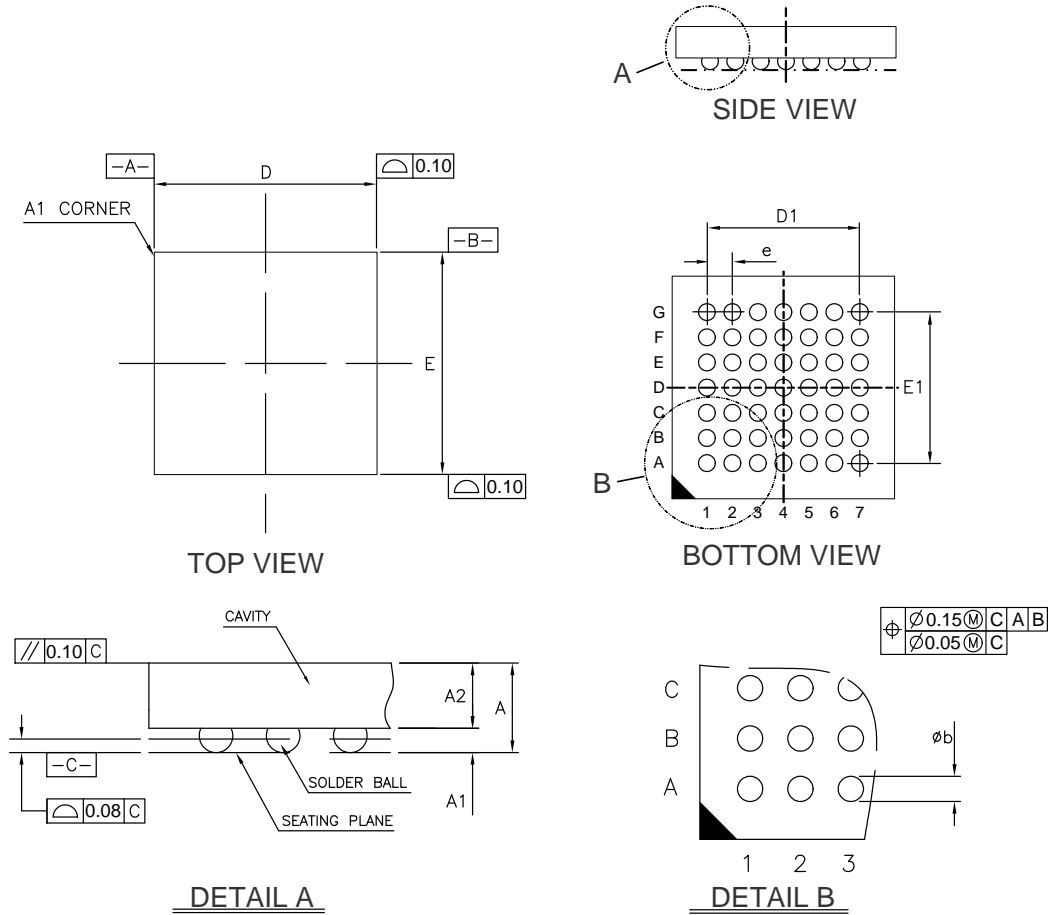


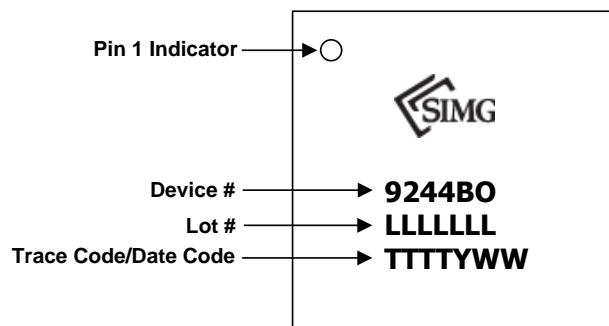
Figure 3. Package Diagram

JEDEC Package Code MO-225

Item	Description	Min	Typ	Max
A	Thickness	—	—	0.80
A1	Stand-off	0.13	0.18	0.23
A2	Body thickness	0.446	0.486	0.57
D	Body size	3.40	3.50	3.60
E	Body size	3.40	3.50	3.60
D1	Footprint	—	2.40	—
E1	Footprint	—	2.40	—
b	Ball width	0.20	0.25	0.30
e	Ball pitch	—	0.40	—

Marking Specification

Marking drawings are not to scale.



Universal Packages SiI9244BO	
Legend	Description
LLLLLL	Lot Number
Y	Year of Mfr
WW	Week of Mfr
TTTT	Trace Code

Figure 4. Marking Diagram

Ordering Information

Part Number	Pixel Clock Range	Interface	Resolution/Refresh Rate	Package	Temperature Grade
SiI9244BO	25–75 MHz	HDMI	1080p/30 Hz	49 VFBGA	Extended (–30 to +85 °C)

The universal package can be used in lead-free and ordinary process lines.

Disclaimers

These materials are provided on an “AS IS” basis. Silicon Image, Inc. and its affiliates disclaim all representations and warranties (express, implied, statutory or otherwise), including but not limited to: (i) all implied warranties of merchantability, fitness for a particular purpose, and/or non-infringement of third party rights; (ii) all warranties arising out of course-of-dealing, usage, and/or trade; and (iii) all warranties that the information or results provided in, or that may be obtained from use of, the materials are accurate, reliable, complete, up-to-date, or produce specific outcomes. Silicon Image, Inc. and its affiliates assume no liability or responsibility for any errors or omissions in these materials, makes no commitment or warranty to correct any such errors or omissions or update or keep current the information contained in these materials, and expressly disclaims all direct, indirect, special, incidental, consequential, reliance and punitive damages, including WITHOUT LIMITATION any loss of profits arising out of your access to, use or interpretation of, or actions taken or not taken based on the content of these materials.

Silicon Image, Inc. and its affiliates reserve the right, without notice, to periodically modify the information in these materials, and to add to, delete, and/or change any of this information.

Notwithstanding the foregoing, these materials shall not, in the absence of authorization under U.S. and local law and regulations, as required, be used by or exported or re-exported to (i) any U.S. sanctioned or embargoed country, or to nationals or residents of such countries; or (ii) any person, entity, organization or other party identified on the U.S. Department of Commerce's Denied Persons or Entity List, the U.S. Department of Treasury's Specially Designated Nationals or Blocked Persons List, or the Department of State's Debarred Parties List, as published and revised from time to time; (iii) any party engaged in nuclear, chemical/biological weapons or missile proliferation activities; or (iv) any party for use in the design, development, or production of rocket systems or unmanned air vehicles.

Products and Services

The products and services described in these materials, and any other information, services, designs, know-how and/or products provided by Silicon Image, Inc. and/or its affiliates are provided on an “AS IS” basis, except to the extent that Silicon Image, Inc. and/or its affiliates provides an applicable written limited warranty in its standard form license agreements, standard Terms and Conditions of Sale and Service or its other applicable standard form agreements, in which case such limited warranty shall apply and shall govern in lieu of all other warranties (express, statutory, or implied). EXCEPT FOR SUCH LIMITED WARRANTY, SILICON IMAGE, INC. AND ITS AFFILIATES DISCLAIM ALL REPRESENTATIONS AND WARRANTIES (EXPRESS, IMPLIED, STATUTORY OR OTHERWISE), REGARDING THE INFORMATION, SERVICES, DESIGNS, KNOW-HOW AND PRODUCTS PROVIDED BY SILICON IMAGE, INC. AND/OR ITS AFFILIATES, INCLUDING BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND/OR NON-INFRINGEMENT OF THIRD PARTY RIGHTS. YOU ACKNOWLEDGE AND AGREE THAT SUCH INFORMATION, SERVICES, DESIGNS, KNOW-HOW AND PRODUCTS HAVE NOT BEEN DESIGNED, TESTED, OR MANUFACTURED FOR USE OR RESALE IN SYSTEMS WHERE THE FAILURE, MALFUNCTION, OR ANY INACCURACY OF THESE ITEMS CARRIES A RISK OF DEATH OR SERIOUS BODILY INJURY, INCLUDING, BUT NOT LIMITED TO, USE IN NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OR COMMUNICATION, EMERGENCY SYSTEMS, OR OTHER SYSTEMS WITH A SIMILAR DEGREE OF POTENTIAL HAZARD. NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTY OR REPRESENTATION CONCERNING THE PERFORMANCE OF THE INFORMATION, PRODUCTS, KNOW-HOW, DESIGNS OR SERVICES OTHER THAN AS PROVIDED IN THESE TERMS AND CONDITIONS.



1060 E. Arques Avenue
Sunnyvale, CA 94085
T 408.616.4000 F 408.830.9530
www.siliconimage.com